

I claim:

1. A method of fabricating a laminate article, comprising the steps of:
  - 5 providing a plurality of support templates;  
arranging the support template to define a part outline  
corresponding to the laminate article;  
providing at least one primary panel defining an outer surface and  
an inner surface;
  - 10 securing the outer surface of the at least one primary panel to the  
plurality of templates;  
arranging at least one secondary panel on the inner surface of the  
primary panel in a desired relationship with the primary  
panel;
  - 15 securing a vacuum bag to the at least one primary panel to define a  
vacuum chamber; and  
applying a vacuum to the vacuum chamber to remove air from  
between the at least one primary panel and the at least one  
secondary panel.
- 20 2. A method as recited in claim 1, in which:  
the step of providing at least one primary panel comprises the step  
of providing a plurality of primary panels; and  
the step of securing the outer surface of the at least one primary  
25 panel to the plurality of support templates comprises the step  
of securing the outer surfaces of the primary panels to the  
plurality of support templates to define a primary layer of the  
laminate article.
- 30 3. A method as recited in claim 2, in which at least two of the

primary panels abut each other to define an edge joint, the method further comprising the step of sealing the edge joint.

4. A method as recited in claim 1, in which the at least one  
5 primary panel is a first skin panel, where the step of arranging the at least one secondary panel on the inner surface of at least one primary panel comprises the steps of:

providing at least one core panel defining first and second surfaces;  
arranging the first surface of the at least one core panel against the  
10 inner surface of the at least one primary panel;  
providing at least one second skin panel defining an inner surface  
and an outer surface; and  
arranging the inner surface of the at least one second skin panel  
against the second surface of the at least one core panel.

15

5. A method as recited in claim 2, in which the plurality of  
primary panels are first skin panels, where the step of arranging the at  
least one secondary panel on the inner surface of the plurality of primary  
panel comprises the steps of:

20 providing a plurality of core panels each defining first and second  
surfaces;  
arranging the first surfaces of the core panels against the inner  
surfaces of the primary panels;  
providing a plurality of second skin panels each defining an inner  
25 surface and an outer surface; and  
arranging the inner surfaces of the second skin panels against the  
second surfaces of the core panels.

6. A method as recited in claim 1, in which the step of arranging  
30 at least one secondary panel on the inner surface of the primary panel in a

desired relationship with the primary panel comprises the steps of:  
securing at least one locator peg to the primary panel; and  
forming at least one locator hole in the at least one secondary  
panel; and

5        displacing the at least one secondary panel such that the at least  
one locator hole receives a corresponding locator peg.

7.        A method as recited in claim 4, in which the step of arranging  
the plurality of secondary panels on the inner surface of the primary panel  
10        in a desired relationship with the primary panel comprises the steps of:  
securing at least one locator peg to the primary panel; and  
forming at least one locator hole in the at least one core panel;  
forming at least one locator hole in the at least one second skin  
panel; and  
15        displacing the at least one core panel and the at least one second  
skin panel such that the locator holes therein receive a  
corresponding locator peg.

8.        A method as recited in claim 6, further comprising the step of  
20        forming bleeder holes in the at least one secondary panel.

9.        A method as recited in claim 7, further comprising the step of  
forming bleeder holes in the at least one core panel and the at least one  
second skin panel.

25

10.       A method as recited in claim 4, further comprising the steps  
of:

forming channels between the at least one core panel and the first  
and second skin panels; and

30

causing resin to flow through the channels.

11. A method of fabricating laminate articles, comprising the steps of:

5 providing at least one primary layer defining an inner surface;  
providing at least one locator peg;  
securing the at least one locator peg to the primary layer;  
providing at least one secondary layer;  
forming at least one locator hole in the secondary layer;  
10 displacing the secondary layer relative to the primary layer such  
that the at least one locator peg enters the at least one  
locator hole;  
applying a vacuum to the primary layer and the secondary layer  
such that  
15 air is withdrawn from between the primary layer and the  
secondary layer, and  
hardenable material is dispersed between the primary layer  
and the secondary layer.

12. A method as recited in claim 11, in which:

20 the step of providing at least one secondary layer comprises the  
steps of  
providing a plurality of secondary layers; and  
forming at least one locator hole in each of the plurality of  
secondary layers;  
25 the step of displacing the at least one secondary layer relative to  
the primary layer further comprises the steps of displacing  
the plurality of secondary layers relative to the at least one  
primary layer such that the at least one locator peg enters  
the at least one locator hole formed in each of the plurality of  
30 secondary layers; whereby

the vacuum withdraws air from between the primary layer the  
plurality of secondary layers, and  
the vacuum disperses the hardenable material between the primary  
layer the plurality of secondary layers.

5

13. A method as recited in claim 12, in which at least one of the  
plurality of secondary layers is arranged at least partly between the  
primary layer and another of the secondary layers.

10

14. A method as recited in claim 11, in which:  
the step of providing at least one secondary panel comprises the  
steps of  
providing first and second secondary panels; and  
forming at least one locator hole in each of the first and

15

second secondary panels;  
the step of displacing the at least one secondary panel relative to  
the primary panel further comprises the steps of displacing  
the first and second secondary panels relative to the primary  
panel such that the at least one locator peg enters the at  
least one locator hole formed in each of the first and second  
secondary panels; whereby

20

the vacuum withdraws air from between the primary panel and the  
first secondary panel and between the first secondary panel  
and the second secondary panel, and

25

the vacuum disperses the hardenable material between the primary  
panel and the first secondary panel and between the first  
secondary panel and the second secondary panel.

30

15. A method as recited in claim 14, in which:  
the primary panel is a fiberglass panel;

the first secondary panel is a core panel; and  
the second secondary panel is a fiberglass panel.

16. A method as recited in claim 11, in which:
- 5 the step of providing the at least one locator peg comprises the  
step of providing a plurality of locator pegs;  
the step of securing the at least one locator peg to the primary  
panel comprises the step of securing the plurality of locator  
pegs to the primary panel;
- 10 the step of providing at least one secondary panel comprises the  
steps of  
providing a plurality of secondary panels; and  
forming at least one locator hole in each of the plurality of  
secondary panels;
- 15 the step of displacing the at least one secondary panel relative to  
the primary panel further comprises the steps of displacing  
the plurality of secondary panels relative to the primary panel  
such that one locator peg enters the at least one locator hole  
formed in each of the plurality of secondary panels.

- 20 17. A method as recited in claim 16, in which at least two of the  
plurality of secondary panels are in contact with the primary panel and  
define a secondary panel juncture.

- 25 18. A method as recited in claim 11, in which:  
at least two primary panels are provided; and  
the at least two primary panels define at least one primary edge  
juncture.

- 30 19. A method as recited in claim 18, further comprising the step

of sealing the primary edge juncture.

20. A method as recited in claim 11, in which:  
at least two secondary panels are provided; and  
5 the at least two secondary panels define a secondary edge  
    junction.

21. A method as recited in claim 19, in which:  
at least two secondary panels are provided; and  
10 the at least two secondary panels define a secondary edge  
    junction.

22. A method as recited in claim 11, in which:  
at least two secondary panels are provided; and  
15 the at least two secondary panels define a secondary face juncture.

23. A method as recited in claim 11, further comprising the steps  
of:  
providing a support structure defining a part outline; and  
20 supporting the at least one primary panel on the support structure  
    to form an outer skin that substantially follows the part  
    outline.

24. A method as recited in claim 11, in which the step of  
25 providing the support structure comprises the steps of:  
    providing a plurality of template members; and  
    arranging the template members in a template array.

25. A method as recited in claim 11, in which:  
30 at least two primary panels are provided;

at least two secondary panels of a first type are provided;  
at least two secondary panels of a second type are provided;  
the at least two primary panels are arranged to define an outer skin  
layer;

5 the at least two secondary panels of the first type are arranged to  
define core layer;  
the at least two secondary panels of the second type are arranged  
to define an inner skin layer, where the core layer is  
arranged between the outer skin layer and the inner skin  
10 layer.

26. A method as recited in claim 25, further comprising the steps  
of:

providing a release sheet; and  
15 arranging the release sheet on the inner skin layer.

27. A method as recited in claim 26, further comprising the steps  
of:

providing at least one bleeder sheet; and  
20 arranging the at least one bleeder sheet on the at least one release  
sheet.

28. A method as recited in claim 27, further comprising the steps  
of:

25 providing at least one breather sheet; and  
arranging the at least one breather sheet on the outermost release  
sheet.

29. A method as recited in claim 11, further comprising the step  
30 of:



forming a plurality of bleeder holes in the secondary panel; where  
the step of applying a vacuum between the primary panel and the  
secondary panel further comprises the steps of withdrawing  
air from the bleeder holes and forcing hardenable material  
into the bleeder holes.

5

30. A method as recited in claim 25, further comprising the step  
of:

forming a plurality of bleeder holes in the secondary panels forming  
the core layer and the inner skin layer; where  
the step of applying a vacuum between the primary panel and the  
secondary panel further comprises the steps of withdrawing  
air from the bleeder holes and forcing hardenable material  
into the bleeder holes.

10

15

31. A method as recited in claim 30, in which the at least one  
locator peg is secured to the inner surface of the primary panel such that  
the bleeder holes in the secondary panels forming the core layer and inner  
skin layer are substantially aligned.

20

32. A method as recited in claim 31, further comprising the steps  
of:

providing a release sheet;  
forming a plurality of bleeder holes in the release sheet; and  
arranging the release sheet on the inner skin layer such that the  
bleeder holes in the release sheet are substantially aligned  
with the bleeder holes in the inner skin layer.

25

33. A method as recited in claim 11, further comprising the step  
of applying hardenable material to the inner surface of the at least one

30

primary panel.

34. A method as recited in claim 11, further comprising the step  
of introducing hardenable material between the primary panel and the at  
5 least one secondary panel.

35. A method as recited in claim 11, in which the step of  
applying a vacuum between the primary panel and the secondary panel  
comprises the steps of:  
10 providing a vacuum bag; and  
sealing the vacuum bag to at least one of the primary panel and the  
secondary panel to prevent air outside the vacuum bag from  
flowing between the primary panel and the secondary panel.

15